

CLAIMS

Sub
1. A cutting or grinding oil composition for a minimal quantity lubrication system comprising an ester.

2. The oil composition according to claim 1 wherein said ester has an iodine value of 0 to 80.

3. The oil composition according to claim 1 wherein said ester has a bromine value of 0 to 50 gBr₂/100g.

4. The oil composition according to claim 1 wherein said ester has a hydroxyl value of 0.01 to 300 mgKOH/g.

5. The oil composition according to claim 1 wherein said ester has a saponification value of 100 to 500 mgKOH/g.

6. The oil composition according to claim 1 wherein said ester is a synthetic ester.

7. The oil composition according to claim 1 wherein said ester comprises a polyhydric alcohol selected from the group consisting of those of from dihydric- to decahydric-alcohols and a fatty acid having 2 to 24 carbon atoms.

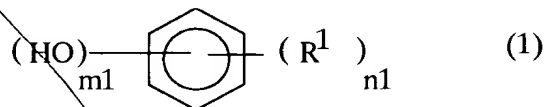
~~8. The oil composition according to claim 1 wherein said ester is contained in an amount of 10 percent by mass or more, based on the total mass of the composition.~~

~~9. The oil composition according to claim 1 further comprising one or more oiliness improvers.~~

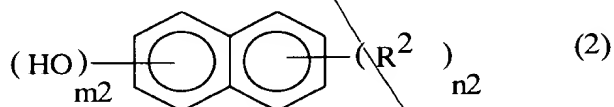
Sub 3
~~10. The oil composition according to claim 9 wherein said oiliness improvers are selected from the group consisting of (A) alcohols, (B) carboxylic acids, (C) sulfides of unsaturated carboxylic acids, (D) compounds represented by formula (1) given below, (E) compounds~~

represented by formula (2) given below, (F) polyoxyalkylene compounds, and (G) esters;

said formula (1) being represented by the formula



wherein R¹ is a hydrocarbon group having 1 to 30 carbon atoms, m₁ is an integer from 1 to 6, and n₁ is an integer from 0 to 5; and said formula (2) being represented by the formula



wherein R² is a hydrocarbon group having 1 to 30 carbon atoms, m₂ is an integer from 1 to 6, and n₂ is an integer from 0 to 5.

11. The oil composition according to claim 9 wherein said oiliness improvers are contained in an amount of 0.1 to 50 percent by mass, based on the total mass of the composition.

12. The oil composition according to claim 1 ~~or 9~~ further comprising oxidation inhibitors.

13. The oil composition according to claim 12 wherein said oxidation inhibitor are one or more compounds selected from the group consisting of L-ascorbic acid (vitamin C), fatty acid ester of L-ascorbic acid, tocopherol (vitamin E), 2,6-di-tert-butyl-p-cresol (DBPC), 3,5-di-tert-butyl-4-hydroxyanisole, 2-tert-butyl-4-hydroxyanisole, 3-tert-butyl-4-hydroxyanisole, 1,2-dihydro-6-ethoxy-2,2,4-trimethylquinoline (ethoxyquin), 2-(1,1-

dimethyl)-1,4-benzenediol (TBHQ), and 2,4,5-trihydroxybutyrophenone (THBP).

14. The oil composition according to claim 12 wherein said oxidation inhibitors are one or more compounds selected from the group consisting of L-ascorbic acid (vitamin C), fatty acid ester of L-ascorbic acid, tocopherol (vitamin E), 2,6-di-tert-butyl-p-cresol (DBPC), and 3,5-di-tert-butyl-4-hydroxyanisole.

15. The oil composition according to claim 12 wherein said oxidation inhibitors are contained in an amount of 0.01 to 10 percent by mass, based on the total mass of the composition.

16. A minimal quantity lubrication system in which cutting or grinding is conducted while supplying an oil in a minimal quantity of 0.001 ml/minute to 1 ml/minute, together with a compressed fluid, characterized in that said oil contains an ester as a base oil.